

**INDIANA DEPARTMENT OF TRANSPORTATION
OFFICE OF MATERIALS MANAGEMENT**

**MOISTURE PERMEABILITY OF EPOXY SEALER FILMS
ITM No. 605-08T**

1.0 SCOPE.

- 1.1** This method of test covers the procedure to determine the moisture permeability of an epoxy sealer when the sealer is applied by immersion to a porous surface.
- 1.2** The values stated in either acceptable English or SI metric units are to be regarded separately as standard, as appropriate for a specification with which this ITM is used. Within the text, SI metric units are shown in parenthesis. The values stated in each system may not be exact equivalents; therefore, each system shall be used independent of the other, without combining values in any way.
- 1.3** This ITM may involve hazardous materials, operations, and equipment and may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and determining the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 AASHTO Standards.

M 231 Weighing Devices Used in the Testing of Materials

2.2 ASTM Standards.

C 27 Fireclay and High-Alumina Refractory Brick

D 1193 Reagent Water

E 145 Gravity-Convection and Forced-Ventilation Ovens

3.0 TERMINOLOGY. Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101.

4.0 SIGNIFICANCE AND USE. This ITM shall be used to determine the moisture permeability of an epoxy sealer when the sealer is applied by immersion to a porous surface.

5.0 APPARATUS.

- 5.1** Fireclay Refractory Brick, 9 in. (228 mm) Class Super-Duty, Type Regular in accordance with ASTM C 27
- 5.2** Oven, forced draft, Type IIA, in accordance with ASTM E 145
- 5.3** Immersion bath, capable of temperature control at $75 \pm 5^{\circ}\text{F}$ ($24 \pm 3^{\circ}\text{C}$)
- 5.4** Scale, Class G2, in accordance with AASHTO M 231

6.0 REAGENTS.

- 6.1** Water, reagent grade as defined by Type II and Type III of ASTM D 1193

7.0 PROCEDURE.

- 7.1** Cut three quarter-brick specimens by halving the brick along a plane parallel to the 9 in. by 2 1/2 in. or 9 in. by 3 in. (228 mm by 64 mm or 228 mm by 76 mm) face and along a plane parallel to the 4 1/2 in. by 2 1/2 in. or 4 1/2 in. by 3 in. (114 mm by 64 mm or 114 mm by 76 mm) face. Four of the surfaces of the quarter-brick specimens shall include part of the original molded faces. Remove all loosely adhering particles from each specimen.
- 7.2** Dry the specimens overnight at $120 \pm 2^{\circ}\text{F}$ ($49 \pm 1^{\circ}\text{C}$) in a forced draft oven
- 7.3** Remove the three specimens from the oven and immerse them immediately in freshly mixed epoxy sealer. Maintain the sealer at $75 \pm 5^{\circ}\text{F}$ ($24 \pm 3^{\circ}\text{C}$) during the immersion period. Submerge the specimens for 25 minutes in one position, and then 20 minutes in the reverse position. Throughout the immersion cycle, the specimens shall be supported off the bottom of the container.
- 7.4** Following the immersion interval, remove the specimens from the container and allow them to drain on nail points or similar support. Air dry the specimens in this position for 2 to 3 h with ambient air temperature 70 to 80°F (21 to 27°C) and relative humidity 40 to 60 %.
- 7.5** Place the air dried specimens in a forced draft oven and dry them overnight in $43 \pm 1^{\circ}\text{C}$ ($110 \pm 2^{\circ}\text{F}$).
- 7.6** Remove the specimens from the oven, allow them to cool to room temperature, and determine the weight (mass) of each to the nearest 0.1 gram.

- 7.7** Place the test specimens in water and boil the specimens for 2h. During the boiling period, keep the specimens entirely covered with water, and allow no contact with the heated bottom of the container. At the end of the boiling period, shut off the heat source for the bath, and slowly feed cool distilled water into the bottom of the bath, permitting overflow or venting, until the entire bath is near room temperature.
- 7.8** Remove the specimens from the bath and blot them dry with clean absorbent cotton cloth of a lint free type. Determine the weight (mass) of the specimens individually to the nearest 0.1 g.
- 7.9** Repeat the blotting and weighing steps with each specimen until the difference between the weight (mass) is less than 0.5 g for each specimen.
- 8.0 CALCULATIONS.** Calculate the percentage mass gain of each specimen by the following formula:

$$\text{Percent Weight (Mass) Gain} = \frac{W_w - W_d}{W_d} \times 100$$

where:

W_w = specimen weight (mass) after boiling and blotting

W_d = specimen weight (mass) prior to boiling

- 9.0 REPORT.** The percentage weight (mass) gains of the three specimens are averaged and the average is reported as the Moisture Permeability Percent.